

## **LESSON PLAN**

### **PART I COVER SHEET**

**LESSON TITLE:** Tonedown and Blackout Operations

**TRAINING METHOD:** Discussion – Lecture

**ORGANIZATION PATTERN:** Topical

**REFERENCES:** Technical Report JCCD 94-1, Air Base Camouflage, Concealment, and Deception Guide

**AIDS AND HANDOUTS:** Federal Standard 595a and 595b, Color Chip Books.

Find the following aids in Technical Report JCCD 94-1:

Table 6-2, Summary of Coatings

Table 6-3, Color and Reflectance Requirements

Table 6-4, Aircraft Camouflage Colors

Figure 6-7a, b, and c, Pattern Implemented With Thermal Coatings - Day and Night Images

Figure 6-9, Disruptive Pattern

Figure 6-10, Geometric Pattern

**LESSON OBJECTIVE:** The student should be able to list the methods used to tonedown a facility and understand the concept of overall base tonedown as part of the base CCD effort. Students must know the reasons for using blackout procedures correctly on an air base. Finally, students must master all of the samples of behavior to complete this block.

#### **SAMPLES OF BEHAVIOR:**

1. Identify the purpose of tonedown.
2. Identify the application methods for tonedown coatings.
3. Identify the advantages and disadvantages of coatings.
4. Identify effective blackout operations.

**SUGGESTED COURSES OF INSTRUCTION:** CCD Planners Course and CCD Train-the-Trainer Course

**STRATEGY:** The target audiences for this lesson are CCD planners at base and MAJCOM level, but anyone in the CCD community will benefit from this comprehensive information. This lesson ties in well with the lesson on Camouflage Screening, DPTP K4. Also, this lesson logically follows DPTP K5, Threat Sensor Types and Characteristics, if used. When discussing the threat systems that tonedown and blackout defeats, references to the information in DPTP K5, Threat Sensor Types and Characteristics might be of help in developing the instructor's base of knowledge.

**LESSON OUTLINE:**

Main Point 1: Purpose of Tonedown

Main Point 2: Tonedown Coatings

- a. Visual Coatings
- b. Thermal Coatings
- c. Radar Absorbing Coatings

Main Point 3: Tonedown Methods

- a. Uniform Method
- b. Disruptive Pattern Method
- c. Geometric Pattern Method

Main Point 4: Advantages and Disadvantages of Coatings

Main Point 5: Blackout Operations

## **PART II**

### **TEACHING PLAN**

### **INTRODUCTION**

#### **ATTENTION:**

The human eye is the most effective means for detecting, recognizing, and identifying targets. Experts agree the enemy's eye will for many years, remain a primary threat to us.

#### **MOTIVATION:**

Detection of a target depends on many factors. The colors we use to paint our bases serve a real purpose in a wartime environment. Tonedown projects are relatively inexpensive CCD measures that provide great payoffs in survivability. When we combine tonedown with blackout, we have a strong beginning to the basic CCD program.

#### **OVERVIEW:**

In this lesson we will discuss:

- 1: Purpose of Tonedown
2. Tonedown Coatings
3. Tonedown Methods
4. Advantages and Disadvantages of Coatings
5. Blackout Operations

#### **BODY**

#### **MAIN POINT 1:**

#### **PURPOSE OF**

#### **TONEDOWN**

Tonedown was discussed at length in the lesson on the Basic Principles and Assumptions of CCD, however a few points should be reviewed and expanded.

a. DETECTION  
DEPENDS ON MANY  
FACTORS

Factors to consider for target detection include lighting conditions, target size, target versus background contrast, and atmospheric visibility. Of these factors, target versus background contrast is the most important; therefore, this is the only factor we will deal with in this lesson.

b. HUMAN EYE  
CAPABILITIES

The human eye provides a combination of capabilities unmatched by any other sensor. It has resolution, a wide field of view, and a dynamic light-sensing range. These capabilities are all directly coupled with the reasoning capabilities of the brain.

c. EYE SEES  
REFLECTED LIGHT

The eye sees a solid object because it receives light reflected from that object. The amount of light that reflects from that object is called "reflectance."

d. REFLECTANCE  
DEPENDS ON  
VIEWER  
ORIENTATION AND  
SURFACE  
SMOOTHNESS

Reflectance depends on where the viewer is in relation to the source of light reflection. For example, shiny surfaces reflect in one direction, while matte surfaces reflect in all directions. This occurs because shiny surfaces are smooth and matte surfaces are rough.

e. SHINY VS. SMOOTH  
EXAMPLE

For instance, on a calm day a lake appears like a mirror and the sunlight reflects brightly from it. However, if a strong wind causes waves on the surface, the lake appears rough and reflects very little sunlight.

## f. BLEND

The blend concept makes a target or object appear to be part of its background. This means making the target a similar color or reflectance as the background. Reducing the visual brightness is called tonedown.

g. PURPOSE: LOWER  
CONTRAST TO  
MATCH  
BACKGROUND

The main purpose of tonedown is to simply lower the contrast of our facilities and structures to more closely match their backgrounds.

h. PERCENTAGE OF  
LIGHT REFLECTED

To do this, match the reflectance value of the background color with that of the manmade structures.

CONTRAST IS A  
MEASURABLE VALUE

The contrast between the target and background is a measurable value that can be determined by comparing the amount of pure types of light that can be reflected by colors.

i. LIGHT  
REFLECTANCE IS  
NUMERICAL VALUE

Light reflectance of a color can be converted to a numerical value. This is given as a percentage of light reflected.

j. PURE WHITE IS  
REFLECTIVE, FLAT  
BLACK VERY  
LITTLE

For example, pure white is very reflective of light. Color experts assign it a reflectance value of 86 %. At the other end of the spectrum, flat black is absorbent and reflects very little light. It has a reflectance value of only 3%. Therefore, the contrast between pure white and flat black is .83 or 83%.

REFLECTANCE VALUE  
CLOSE ENVIRONMENT

ACTUAL COLORS  
UNIMPORTANT

Our objective is to paint our buildings and other potential targets with colors having reflectance values close to that of their background environment. This value should be within .03 or 3% of each other. For many years camofleurs believed that colors must be earth tones to be effective tonedown colors. However, we now know the actual colors used to tonedown are unimportant; only their reflectance value is critical. Reds, greens, blues, browns, and grays of the correct reflectance are available. If our civilian neighborhoods aren't all beige and brown, why do we paint our bases contrasting colors? Beige and brown are not necessary and most often contrast with the towns surrounding our base. This appears from the air like an island in the middle of an ocean of civilian buildings. We're not talking about wild paint schemes, just variety.

k. IMPACT ON  
ACQUISITION  
RANGE

If the background contrast and the painted object contrast are within 3% to 5% of each other, we lower the range at which our adversaries detect our facilities.

**INSTRUCTORS NOTE:** The use of Federal Standard No. 595a and 595b charts as examples will aid in this portion of the lesson. If unavailable, tables 6-3 and 6-4 in Technical Report JCCD 94-1 are of equal value.

- l. FEDERAL  
STANDARD 595A  
AND 595B
- m. BOOK OF COLOR  
CHIPS ASSIGNED A  
NUMBER

The General Service Administration's (GSA) standard for DoD paint is Federal Standard No. 595a and 595b.

This is a book of color chips. The chips are grouped by basic colors such as reds, browns, blues, and so on. Each chip is assigned a number. A great deal of information can be derived from that number.

- n. NUMBER EXAMPLE  
FOR EARTH BROWN

For example, number 30097 is Earth Brown. The first digit will always be either a 1, 2, or 3. One (1) means it is a high gloss paint, two (2) means that it is semi-gloss, and three (3), as in this example, means that it is a flat paint, with no gloss.

- o. SECOND DIGIT FOR  
COLOR CATEGORY

The second digit in the sequence is the code for its color category. The zero's (0) are browns such as in our example of earth brown, ones (1) are reds, two's (2) are oranges, and so on.

- p. LAST THREE DIGITS  
ARE APPROXIMATE  
REFLECTANCE  
VALUE

The last three digits give you an approximate reflectance value for that paint. In this example the 097 means that this paint has a reflectance value of .097 or 9.7%. The real earth brown that we see in the countryside has an actual reflectance value of .085 or 8.5%, making this more than close enough for any tonedown project with a difference of only .012, or 1.2%. Remember, all it has to be is within 3% - 5%.

## **MAIN POINT 2. TONEDOWN COATINGS**

- a. PAINTS, STAINS,  
PRIOR PLANNING
- b. VARIOUS TYPES OF  
COATINGS

### **1) VISUAL THREAT**

#### **MOST COATINGS PERMANENT, SOME TEMPORARY**

- a) VEHICLE PAINT  
COLORS

- b) GUIDELINES FOR  
CCD PLANNERS

Now we will discuss available tonedown coatings.

For tonedown, we use paints, stains, and prior planning. In CCD terminology, we refer to paints and stains generically as "coatings."

Various types of coatings which offer CCD potential in the visual, thermal infrared, and radar bands.

Remember: tonedown is not intended to prevent detection of a target. The goal is to delay target acquisition and cause the attacker to miss the window of opportunity to effectively launch weapons.

Camouflage paint has been used for many years and is probably one of the oldest artificial camouflage techniques.

Most coatings are permanent. However, some are specifically designed for temporary use.

White temporary paint for camouflaging vehicles under snow conditions is the best known example. Check with your local transportation unit because other colors are also available. The paints are applied like any vehicle paint, but can be removed by scrubbing with a solvent such as ammonia and water.

The following guidelines help CCD planners develop and implement tonedown effectively:



c) SELECT  
COLORTONES THAT  
MATCH  
COUNTRYSIDE AND  
CONSTRUCTION

Select colortones that match the surrounding countryside and construction. To match the countryside, the base should be painted a variety of colors. Don't paint the whole base one color or set of colors. As mentioned earlier, it will stand out from it's environment.

d) AVOID CHANGING  
PAINT COLORS FOR  
TEMPORARY  
CLIMATES

Match whatever colors are predominant in the environment most of the year. Light green colors work well for temperate climates and olive drab for colder (not arctic) climates. Temporary conditions such as snow or vegetation blossoming should be disregarded. Select permanent coatings.

e) CONCRETE SHOULD  
HAVE  
REFLECTANCE AND  
COLOR OF  
SURROUNDINGS

All aircraft shelters and associated concrete airfield pavements should have the same reflectance value and color as the surrounding environment.

f) ROOFTOPS PAINTED  
WITH A MATTE  
FINISH

Paint corrugated metal buildings and rooftops with a coating that provides a matte finish to reduce both radar and visual reflectance.

BLEND NEW ROOF  
CONSTRUCTION WITH  
SURROUNDINGS

CCD planners should blend all new roof construction with surroundings.

g) ROOFS PAINTED  
DARKER BECAUSE  
OF SHADOWS

Shadows create visual effects around buildings, rooftops and other horizontal surfaces. Include darker "shadow" areas in your paint plans to match the dark color of real shadows.

- h) TONEDOWN  
GENERATORS AND  
OTHER TARGETS OF  
OPPORTUNITY  
Include power generators used or stored outside in the tonedown program. They will be a target of opportunity if not subdued.
- i) NO DISTINCTLY  
CONTRASTING  
COLORS  
Do not use colors that distinctly contrast with surroundings anywhere on military installations.
- j) TRANSITION:  
Up to this point we've primarily focused on coatings on vertical surfaces. Now let's discuss stains on aircraft operating surfaces.
- k) STAINS HAVE A  
BAD REPUTATION  
Stains used to change the appearance of runways, taxiways, and parking ramps have received an undeserved bad reputation. This reputation came primarily from two sources; one in PACAF and one in USAFE.
- l) FIRST SOURCE OF  
BAD REPUTATION  
At a base in the Pacific a poor quality acrylic stain was used. Experts recommended not using this stain at that time. The decision to use the stain was an economic decision with poor consequences.
- m) APPLIED BY  
UNQUALIFIED  
PERSONNEL IN  
WRONG WEATHER  
AND EQUIPMENT  
The stain was applied by unqualified personnel in poor weather conditions with the wrong equipment. Consequently, the stain was applied too heavily and has begun to flake.
- n) NEVER SHOWN TO  
BE CAUSE OF ANY  
ACCIDENT  
While the stain has not been a factor in any accident or incident, it has been criticized by flyers who taxi over it.
- o) PATTERN DID NOT  
MATCH  
SURROUNDINGS  
The largest problem with the stain is that the pattern used did not resemble the surrounding vegetation, and therefore stood out like a bullseye.

- p) FOLLOW THE PRINCIPLE OF BLEND  
To effectively blend, stains applied over a large area must match the area around the stained surface.
- q) RICE PADDIES, SQUARES, TERRAIN CURVES  
For example, an area around rice paddies should be stained to look like the rice paddies from the air. If they are in perfect squares or rectangles, follow the same pattern. If the vegetation follows the terrain and curves in circles, that's the way your stain should be applied as well.
- r) ACID BASED STAIN IS SECOND STRIKE  
b. The second strike against stains came from Europe. An acid based stain etched or "burned" into the concrete. The use of that stain was halted for several years while the environmental effects were studied and evaluated.
- s) CLEARED OF ECOLOGICAL CONCERNS  
After several years, the stains were cleared of any environmental concerns and proved to pose no ecological problems.
- t) NEW STAINS ENTERED MARKET, ACID-BASED NEVER USED AGAIN  
However, by the time they were cleared for use, new and improved stains entered the market. These were easier to apply and were not acid-based. Consequently, acid stains were never again used.
- u) LATER, ASSUMED ONCE AGAIN THAT THERE WAS A HAZARD  
Because they were not used, the assumption was made that they and all other stains were obviously a hazard. Today we try to dispell that myth and teach that stains are not harmful to the environment.

v) STAINS ADDED TO  
CONCRETE WHEN  
MIXED

Stains produced can be added to the concrete mix before it is poured that will allow for permanent tonedown of a building or operating surface. This means surfaces would never need to be painted or stained again!

**TRANSITION:**

New stains come in a number of shades and colors, are completely safe, and actually increase the traction of runways and taxiways.

2) THERMAL  
COATINGS

The next category of coatings we will discuss is thermal reflecting coatings.

|                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INSTRUCTORS NOTE: USE FIGURES 6-7 a, 6-7c, AND 6-7c FROM TECH REPORT JCCD 94-1 TO SHOW THERMAL COATINGS IN THE VISUAL DAYTIME, THERMAL DAYTIME, AND THERMAL NIGHTTIME. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

a) ADJUST HEAT  
RETENTION

In the thermal band, coatings can influence a structures appearance by adjusting the amount of heat retained through solar absorption. Structures will continue to hold heat long after the sun sets. This increases the chances of being located on an enemy's thermal imaging target detection sensor.

b) INCREASE  
REFLECTANCE

How can we reduce the solar absorption? The best way is to increase the light reflectance (solar reflectance) of the surface so less solar energy is absorbed.

c) CAN'T INCREASE  
REFLECTANCE IN  
VISUAL RANGE -  
INCREASE THE  
NEAR-IR

d) GET BETTER  
MATCHING OF  
GREEN  
VEGETATION

e) DECREASES  
CHANCES OF  
BLACK HOLE  
EFFECT

f) MUST ALSO BE  
EFFECTIVE IN  
VISUAL RANGE  
TRANSITION:

3) RADAR  
ABSORBING  
COATINGS

a) HIGH DEGREE OF  
MAINTENANCE  
REQUIRED

However, if we increase the light reflectance we will make the target more conspicuous to the unaided eye in the visual range. Therefore, we recommend that the near IR reflectance signature be increased, thus serving two purposes:

First, assuming the area has green vegetation, we will get a better matching of the near-IR reflectance with the surrounding vegetation. Remember, if we blend, it will be hard to spot the target. Second, the coatings will increase the overall near-IR reflectance of the targets surface. The higher reflectance decreases the chances of a target standing out as a black hole on the IR display of an attacking aircrafts IR sensor.

The final word on thermal coatings is that if they are used, they must also be effective in the visual range.

The next coating we will briefly mention is radar absorbing coatings.

Radar absorbing coatings reduce the radar reflection of ships and aircraft. They are expensive. Therefore, the surface you intend to cover must be worth the expense.

They also require a high degree of maintenance. Experts agree these coatings are generally a poor alternative at this point in the development stage.

b) BETTER TO USE  
RADAR  
SCATTERING  
SCREENS

**TRANSITION:**

**MAIN POINT 3. THREE  
APPLICATION METHODS**

a. UNIFORM METHOD

1) TWO LIMITATIONS

2) LARGE OBJECTS  
CONSPICUOUS

3) SOLAR ABSORPTION  
INCREASES ON  
HORIZONTAL  
SURFACES

A better option is to use radar scattering camouflage screening for fixed installations, combined with an effective visual tonedown program.

Now that we understand what results coatings are designed to produce, let's discuss the different methods of applying them.

Coatings are applied in three ways: Uniform, disruptive pattern, and geometric pattern.

The uniform method places the coating uniformly over the entire surface. Earth tones are the best in the visual range. A frequent mistake is to use colors that are too dark for the usually open background of an air base.

There are two limitations of a uniform surface coating that require consideration. First, large objects such as aircraft shelters will still be conspicuous because of their overall size and shape.

Second when dark toned coatings are applied to horizontal surfaces, solar heat absorption increases. This heat can be retained well into the nighttime hours, causing a bright white spot on aircraft thermal-IR screens.

|                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------|
| <p><b>INSTRUCTORS NOTE: USE FIGURE 6-9 IN TECH REPORT JCCD 94-1 TO DEMONSTRATE AN EFFECTIVE DISRUPTIVE PATTERN</b></p> |
|------------------------------------------------------------------------------------------------------------------------|

b. DISRUPTIVE  
PATTERN  
METHOD

a. MUST USE LARGE  
PATTERN

b. USE AT LEAST  
THREE  
CONTRASTING  
COLORS

The second method of applying coatings is the disruptive pattern. This method paints patterns on the target to disrupt the shape. The patterns used must be large enough to affect visual perception when viewed from a range of 0.8 to 5.5 nautical miles.

Also, at least three colors (such as dark gray, light green, and tan) should be used that contrast with each other, but blend well with the surrounding environment.

|                                                                                         |
|-----------------------------------------------------------------------------------------|
| INSTRUCTORS NOTE: USE FIGURE 6-10 TO DEMONSTRATE AN EFFECTIVE USE GEOMETRIC PATTERNING. |
|-----------------------------------------------------------------------------------------|

c. GEOMETRIC  
PATTERN METHOD

1) GEOMETRIC  
PATTERN METHOD  
EXAMPLES

2) RECTANGULAR  
BETTER THAN  
WIGGLY

Geometric pattern method of coating involves painting shapes on flat surfaces, as opposed to the random patterning of the disruptive style.

Some examples include continuing a road across the building or painting a small neighborhood on top of a large hangar.

Typical airbases have many rectangular objects; therefore, patterns with straight boundaries may be more realistic than ones with wiggly lines.

3) FOLLOW SAME  
PATTERN

Let's go back to an example we used earlier. If fields surrounding the installation are square or rectangular, follow the same pattern. If the vegetation follows the terrain and curves in circles, that's the way your coating should be applied.

4) WORKS FOR LARGE  
TARGETS,  
INSIGNIFICANT FOR  
SMALL ONES

For large targets, any patterning works fairly well. However, using patterning on smaller objects such as generators or vehicles provides no significant survivability against attacking aircraft. Now let's discuss the advantages and disadvantages of coatings.

**TRANSITION:**

**MAIN POINT 4.  
ADVANTAGES AND  
DISADVANTAGES  
OF COATINGS**

a. ADVANTAGES  
OF COATINGS

They are simple and relatively fast to apply.

Preserves the surface.

- Presents no operational or safety hazards on vertical surfaces and horizontal surfaces if applied properly.
- Effective against a visual, near-infrared threat.
- Limited effectiveness against thermal infrared and radar.



## b. DISADVANTAGES OF COATINGS

- Some coatings require renewal at certain intervals.

Do not change colors with the season.

Standard coatings are effective only in the visual range.

- Usually not adequate as a stand alone measure. Needs to be complemented with other CCD measures.
- Environment has to be considered for each type of coating.

INSTRUCTORS NOTE: USE TABLE 6-2 OF TECH REPORT JCCD 94-1 TO SUMMARIZE THE VARIOUS COATINGS AVAILABLE. THIS CHART DISTINGUISHES BETWEEN EACH COATINGS EFFECTIVENESS AGAINST EACH MAJOR THREAT SENSOR (VISUAL, THERMAL IR, AND RADAR).

## c. PRIOR PLANNING

The final point on tonedown is prior planning. While it is extremely difficult to add CCD considerations to all new construction, the effort should be made.

## **TRANSITION**

### **MAIN POINT 5. BLACKOUT OPERATIONS**

#### **a. WATCH FOR PITFALLS**

You should now understand about toning down an air base. Now let's talk about blackout operations.

Blackout is an fundamental part of any CCD program. Most bases have well developed plans for blackout. If these plans are thoroughly thought out, there should be no problems.

Some pitfalls to watch for are things such as battery powered lights that come on automatically when electrical power is lost. The best time to catch something like this is during design reviews. Base civil engineers can provide additional information in the area of designs.

#### **b. WORKS WELL FOR GROUND SPECIAL OPS FORCES AS WELL AS AIR ATTACK**

Bases that have limited or no air threat often believe they have no need for a blackout plan. Generally speaking, this is incorrect. Blackout works very effectively against special operations forces (SOF) as well as air threats.

#### **c. FRIENDLY FORCES HAVE NVD'S**

Remember, our air base ground defense (ABGD) forces have night vision devices, or NVD's. Many special operations forces don't use NVD technology because they cannot carry the extra weight into a hostile area. This means they are going to have difficulty in moving around in the dark in unfamiliar territory. Check with your local intelligence agency for SOF capabilities and threats in your area.

SPECIAL OPS AT  
SECURITY POLICE  
MERCY

If the security police do have NVD's and the SOF do not, the SOF will be at the SP's mercy.

d. WATCH FOR  
SPECIAL OPS  
STANDOFF  
WEAPONS

If SOF decide to use standoff weapons, leaving the lights on around the base creates a well-lit target range. However, the use of small amounts of light in certain areas for deterrence is usually acceptable, but should be examined closely.

e. LIGHTED ISLANDS  
USED AS TARGET  
OFFSET AIM POINT

A lighted island in a sea of darkness could be used as a targeting offset aim point. For example, if the KC-10 parking ramp is usually lit at night, the enemy may use that to estimate that 200 yards to the right is the wing command post, their target.

f. USE TO OUR  
ADVANTAGE

We can use this to our advantage, though. By providing light to another area and leaving the ramp dark, we can create a false target, or maybe even a false target offset aim point.

g. REVERSE IS TRUE IN  
LARGE CITIES

One final word on blackout operations - the reverse is true in the case of blackout. If you have an air base in the middle of a large city, blacking it out would cause it to be a darkened target. Using lights in this area would be smarter than turning them off.

**SUMMARY:**

I have just briefed you on the key aspects of tonedown and blackout operations, we covered the purpose of tonedown and how it works, different types of tonedown coatings, tonedown methods, and finally we looked at the advantages and disadvantages of the various types of coating and blackout operations.

**REMOTIVATION:**

You must understand and implement what we have covered in this section to effectively tonedown your installation and make it harder for our potential adversaries to strike us.

**CLOSURE:**

This concludes this lesson.

**TRANSITION:**

(Develop locally to transition to the next topic.)

### **PART III EVALUATION TEST ITEMS**

#### **1. LESSON OBJECTIVE: Identify the purpose of tonedown.**

**QUESTION: (Multiple Choice)**

**Which of the following is a purpose of tonedown?**

- a. Increase the visual brightness.**
- b. Increase the inherent contrast of targets with their backgrounds.
- c. Sharply contrast the reflectance value of the background with the manmade structures.
- d. Reduce the contrast of our targets to within 3% to 5% of their background.

Key: d.

REFERENCE: Main Point 1.

---

#### **2. LESSON OBJECTIVE: Identify the various types of tonedown coatings.**

**QUESTION: (Multiple Choice)**

**Which of the following coatings offer the most CCD potential in terms of tonedown?**

- a. Visual
- b. Radar Reflecting
- c. Radar Absorbing
- d. Infrared Absorbing

Key: a.

REFERENCE: Main Point 2.

#### **3. LESSON OBJECTIVE: Identify the application methods for tonedown coatings.**

**QUESTION: (Multiple Choice)**

**Which of the following is NOT a method of applying tonedown coatings?**

- a. Uniform.
- b. Geometric.
- c. Disruptive.
- d. Camouflage.

Key: d.

REFERENCE: Main Point 3.

---

4. **LESSON OBJECTIVE:** Identify the advantages of coatings.

QUESTION: (Multiple Choice)

Which of the following is an advantage of coatings?

- a. Complex, yet and relatively quick to apply.
- b. Thorough effectiveness against thermal infrared and radar.
- c. Effective countermeasure for visual and near infrared threats.
- d. Adequate stand alone measure without other CCD measures.

Key: c.

REFERENCE: Main Point 4.

5. **LESSON OBJECTIVE:** Identify effective blackout operations.

QUESTION: Which of the following statements is FALSE concerning blackout?

- a. Bases that have no air threat still need a blackout plan.
- b. Blackout works effectively against special operations forces.
- c. Special operations forces usually carry night vision devices.
- d. Using small amounts of lighting in certain areas is acceptable.

Key: c.

REFERENCE: Main Point 5.

#### **PART IV RELATED MATERIALS**

1. Federal Standard 595a and 595b, Color Chip Books.
2. The following aids are found in Technical Report JCCD 94-1:
  - a. Table 6-2, Summary of Coatings

- b. Table 6-3, Color and Reflectance Requirements
- c. Table 6-4, Aircraft Camouflage Colors
- d. Figure 6-7a, b, and c, Pattern Implemented With Thermal Coatings - Day and Night Images
- e. Figure 6-9, Disruptive Pattern
- f. Figure 6-10, Geometric Pattern